MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2015/2016

TDB1131 – DATABASE SYSTEMS

(All sections / Groups)

15 OCTOBER 2015
9.00 a.m - 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **6 QUESTIONS** with **TWO** sections only.
2. Attempt all questions in **Section A** and attempt **TWO** out of **THREE** questions in **Section B**.
3. If you attempt all questions in Section B, only the first two questions are considered.
4. You are allowed to use calculators in this examination.
5. Please print all your answers in the Answer Booklet provided.

SECTION A: Answer ALL (30 marks)

QUESTION 1

(a) Briefly describe three functions of Database Management Systems (DBMS).

[6 marks]

(b) Given the following attributes in the form of first normalization. Normalize the dependency to 2NF and indicates the primary key. [4 marks]

Adviser_ID	Adviser_Name	Stu_ID	Stu_Name	Department	Phone	Office

QUESTION 2

Given the following business rules, create the appropriate ERD. You must indicate the primary key, foreign key (if any), at least two attributes for each entity, and connectivity.

- A department employs many employees, but each employee is employed by one department.
- Some employees, known as "rovers" are not assigned to any department.
- A division operates many departments, but each department is operated by one division.
- An employee may be assigned many projects, and a project may have many employees assigned to it.
- A project must have at least one employee assigned to it.
- One of the employees manages each department, and each department is managed by only one employee.
- One of the employees runs each division and each division is ran by only one employee.

[10 marks]

Continued.....

QUESTION 3

Assume that you have the following entities with attributes. The primary key for each entity is highlighted in bold. The date is requested to be printed in this format: YYYY-MM-DD.

Staff (**Staff_ID**, Staff_Lname, Staff_Fname, Staff_HireDate, Job_Code, Emp_Years)
Job (**Job_Code**, Job_Description, Job_Chg_Hour, Job_Last_Update)
Project (**Proj_Num**, Proj_Name, Proj_Value, Proj_Balance)
WorkItem (**WorkI_Num**, WorkI_Date, Proj_Num, Staff_ID, WorkI_Job, WorkI_Chg_Hr, WorkI_Hours, WorkI_Charge)

The diagram below illustrates the relationship among the entities.

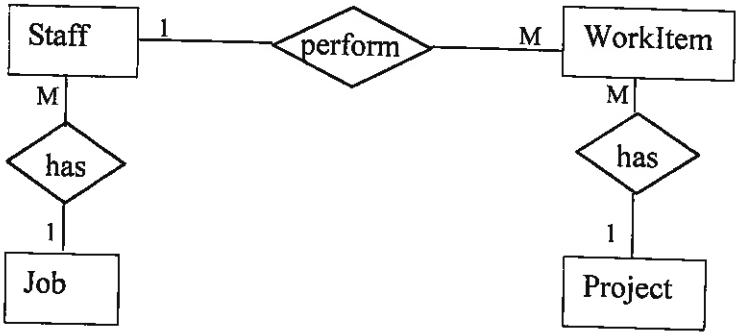


Fig. 1 ERD

Answer the following questions:

(a) Assume that you have created all tables and inserted the necessary records. Write the SQL command that displays the details of staff who are hired between 1/1/2014 to 31/12/2014. [2.5 marks]

(b) How to sort the projects information according to the value of the project (Proj_Value) in descending order? Please write the appropriate SQL command. [2 marks]

(c) One of the records in the Project table has been entered wrongly, where the project number (Proj_Num) is 23. The current project balance in the record is RM15,000 but in fact, it should be RM150,000. Please write the SQL command to update the record. [3 marks]

(d) The manager wants to find out the projects that the staffs are currently working on. He wants to know the staffs' name (both first and last) and the hours they work on each project (i.e. WorkI_Hours). Please write the SQL command to display this information. [2.5 marks]

Continued.....

SECTION B: Attempt TWO out of THREE questions (20 marks)

QUESTION 4

(a) Table 1 stores information about project managers.

Project_ID	Manager	Manager_Phone	Manager_Address
P01	Jane D. Parker	123-456-777	52, Jalan Mutiara, 75350 Batu Berendam, Melaka.
P02	George K. Moor	987-654-333	50 Jalan Bukit Beruang Utama, 75450 Bukit Beruang, Melaka.
P03	Jane D. Parker	123-456-777	52, Jalan Mutiara, 75350 Batu Berendam, Melaka.
P04	Jane D. Parker	123-456-777	52, Jalan Mutiara, 75350 Batu Berendam, Melaka.

Table 1 The file structure of projects.

(i) What problem would you encounter if you want to produce a listing by city name? How would you solve this problem by altering the file structure?

[2 marks]

(ii) What data redundancies do you detect? How could those redundancies lead to anomalies?

[2 marks]

(a) You have been requested to develop a simple database for a clinic where they have their initial records store in spreadsheet. The first dependency among the attributes is shown as below:

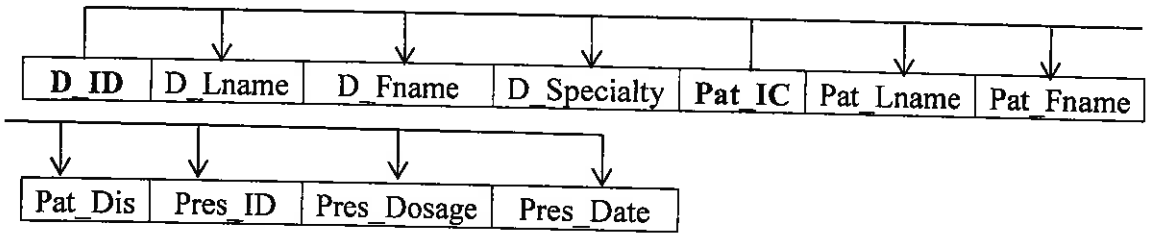


Fig. 2 Dependency among attributes

Please identify the partial and transitive dependencies based on Fig. 2. Show the 3NF conversion result.

[6 marks]

Continued.....

QUESTION 5

(a) Briefly describe two classical design approaches in database. [3 marks]

(b) Given the following table called Students.

Stu_ID	Stu_Fname	Stu_Lname	Stu_Major	Stu_Fac	Stu_Status	Stu_Email
235684	Behen	Groden	Robotics	FOE	Pass	behen@yahoo.com
235611	Bernard	Laboy	Security Tech	FIT	Pending	BL@gmail.com
235667	Bryan	Groden	Electronics	FOE	Supp	Bryan15@gmail.com
235700	Janice	Fifield	Data Comm.	FIT	Pass	Jan123@yahoo.com
235655	Mandy	Mcdonnell	Accounting	FOM	Pass	McHero@yahoo.com
235686	Marianne	Earman	Marketing	FOM	Pass	MyDearM@gmail.com
235699	Sue	Haakinson	Data Comm.	FIT	Fail	SueH@gmail.com

Table 3 Students.

(i) Assume that the table is partitioned according to faculties. Show the horizontal fragmentation that includes fragment name, students ID (using the available sample data from Table 3) and condition. [4.5 marks]

(ii) The Security Department (SD) has recently installed a new entrance system where students must enter the campus through student ID scan. To ensure successful system implementation, all students information are required by SD. Provide the vertical fragmentation by providing the fragment name and the name of attributes needed by SD. [2.5 marks]

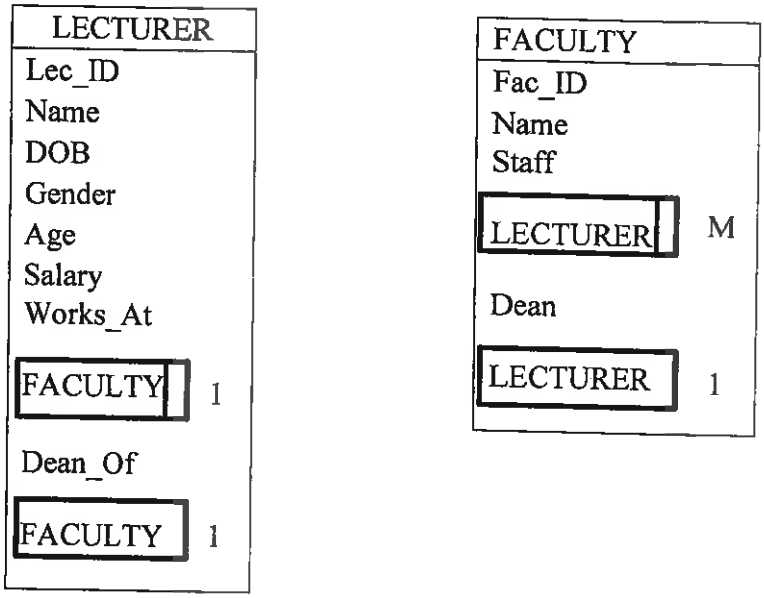
Continued.....

QUESTION 6

(a) Assume that you have been hired as a database administrator in a new college. While designing the database, you have encountered an entity Student that is having a multivalued attribute, named as Stu_Subject. Multivalued attributes would create difficulty in record searching. How would you solve the problem of multivalued attributes? [2 marks]

(b) What information are store in a transaction log? Please list out four. [4 marks]

(c) Based on the given Object Oriented Data Model, describe the business rules that reflect the relationships between LECTURER and FACULTY. [4 marks]



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